

4-2019

Land Use Changes and Zoning Alternatives in Auburn, Maine's Agriculture and Resource Protection District

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Lynch, Signe; Krull, Emerson; and Anderson, William, "Land Use Changes and Zoning Alternatives in Auburn, Maine's Agriculture and Resource Protection District" (2019). *Community Engaged Research Reports*. 55.
https://scarab.bates.edu/community_engaged_research/55

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Bates College
Lewiston, Maine

Land Use Changes and Zoning Alternatives in Auburn, Maine's Agriculture and Resource Protection District

A Bates Environmental Studies Capstone Project

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ENVR 417
Professor Francis Eanes and Professor Karen Palin
Winter 2019

Executive Summary

In an effort to protect natural resources and promote agricultural productivity, the City of Auburn established the Agriculture and Resource Protection (AGRP) zoning district in 1964. The “Ag Zone,” as we will be referring to it in this report, is still a critical component of Auburn’s landscape, making up 45% of the city’s total acreage (Ad Hoc Committee, 3). Since the creation of the Ag Zone in the early 1960’s, Auburn’s farming and forestry culture have changed and the population has declined.. In recent years, several committees and consultants have considered these shifting trends and have noted that amendments are necessary to current Ag Zone regulations. As a contribution to the larger discussion on the future of the Ag Zone, our project provides a new, historical perspective on how land use and land cover has changed throughout Auburn, since the establishment of the Ag Zone. An understanding of these changes can give Ag Zone stakeholders a more holistic understanding of the effectiveness of this district’s zoning, as well as potential alternatives for the future of Auburn.

In this report, we introduce the Ag Zone’s priorities and goals, as well as maps displaying the changes in land use in this district between the years 1973 and 2018. It is important to acknowledge that we also explored the Ag Zone’s original intent to protect forest and agricultural land from development and how these initial priorities continue to be apparent in current Ag Zone land use practices. In addition to this major mapping component, this report also examines *other* regions’ approaches to zoning districts of agriculture and resource protection, and how such approaches might be applicable in Auburn.

In order to visualize the geographic changes of the Ag Zone, we utilized ArcGIS to classify aerial photographs of Auburn in 1973 and 2018. This report includes two classified

maps, demonstrating land cover of the Ag Zone in 1973 and land cover in 2018, as well as current and historical boundaries of the Ag Zone. One overall trend found in our analysis is that the Ag Zone has decreased by roughly 5,000 acres since its creation. This decrease in acreage is due to rezoning which extended Rural Residential opportunities, particularly along city roads and Interstate-95. However, the original restrictions remain in place and have effectively limited development in rural Auburn.

The classified categories of land cover that the 1973 and 2018 maps convey include water, forest, fields and developed land. Upon classification, we examined the acreage of each land cover category and how these numbers have shifted in recent decades. One of the noteworthy changes was that in 1973, the Ag Zone consisted of roughly 54% forest while in 2018, roughly 62% of the Ag Zone was forested. Previously tilled fields have grown in with forests largely due to an overall declining trend in farming. Thus, there has clearly been an *overall* pattern of reforestation in the Ag Zone, and an increase in forest acreage in all of Auburn as well. In other words, forest continues to be the dominant resource in Auburn and in the Ag Zone. As a result of increase in forests, “fields” in the Ag Zone have decreased by approximately 3,500 acres, or by 34%. Fields have decreased overall in Auburn, but also in the Ag Zone as well. It is also interesting to note that in Auburn, there has been a 16% overall increase in developed land, while the Ag Zone has seen a 33% decrease in the percentage of land which is covered by development. The 16% overall increase in development has taken place in districts that have either never been Ag Zone or were previously Ag Zone which has since been rezoned to Rural Residential.

With our data gathered from map classifications, we examined other regions' approaches to regulating agriculture and natural resource protection zones. This report, in particular, includes analysis of transfer of development rights (TDR) programs, cluster development plans, and rezoning strategies. A robust discussion on alternatives is included in the Results and Discussion section of this report with additional insight of our process and extended examples in the appendices. Alternatives explored include Unity, Maine's Agriculture Protection Incentive Measure as well Burlington, Vermont's specific zoning strategies that prioritize recreation, conservation, agriculture, and open space. These approaches as outlined in our Results section have potential to be applied to Auburn's zoning in the future.

Although our land use classification provides helpful insight, we acknowledge limitations of the classification system including discrepancies with our classifications of fields and development. Using our current classification system, developed land such as golf courses (i.e. Fox Ridge Golf Course) are coded as fields due to its aerial similarity with tilled fields. Hence, our specific numbers for land use change should be understood holistically, as numbers are subject to change depending on what is defined as "development." The biggest obstacle encountered in conducting this research was a lack of good, baseline data. The 1973 aerial imagery used was the clearest, most complete, and taken closest to the start of the Ag Zone's creation. But, due to technological differences compared to today's imagery, the 1973 flyover data had quality/resolution discrepancies that made classification more challenging. Despite the power of ArcGIS, there is a degree of deviation when it comes to land classification which was particularly evident in 1973, compared to the higher quality imagery taken in 2018 as part of the Maine GeoLibrary Boards orthoimagery project.

The overall goal of this project was to provide additional insight on the current discussion of the future of Auburn's Agriculture and Resource Protection District. Showing how Auburn's land has changed over time is imperative in having a comprehensive discussion on what is the best course of action for the *future* of the Ag Zone. The work we have done in this project is foundational in building an extensive knowledge on not just changes to the Ag Zone, but on all of Auburn. Although discrepancies *do* exist in mapping, with extensive time, the classification process could be refined to fix potential issues and to provide the most accurate picture of land use changes as possible. With this, we recommend additional GIS resources be allocated to a potential internship position for the city, or taken over by another Capstone group to continue the work of this project. In addition, we hope that Auburn can look at alternative approaches to land use and consider how these varieties of approaches have potential to be integrated into discussion on the future of the Ag Zone.

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Introduction

Since 1964, the city of Auburn has had an established zoning district designated for agriculture and natural resource protection. The Agriculture and Resource Protection (AGRP, or Ag Zone) zoning district was intended to integrate farmland and promote agriculture in the city of Auburn, restricting development to the downtown area and protecting valuable natural resources from the purchase of rural land for private development (i.e. buying a large plot of forested land, clearcutting, building homes, then subdividing and selling which would result in the destruction of local ecology, raising surrounding property values, and causing the spread of urban sprawl). The Ag Zone was intended to integrate agricultural and forestry industries with the manufacturing and retail businesses in the city of Auburn and beyond (Ad Hoc Committee, 4). The zoning laws were a result of widespread recognition of the economic importance of agriculture and the positive effect it can have on the image and character of the city. The city of Auburn also viewed the unplanned, scattershot development outside the downtown area as fiscally imprudent as well as have significant effects on Auburn's expansive natural resources. Since its initial implementation, the boundaries of the Ag Zone have changed; these changes can be seen in Figure 1.

In considering the Ag Zone's presence today, it is important to acknowledge that since 1964, Auburn's economic, social and environmental contexts have shifted. For example, between the 1960s and the 1980s, $\frac{3}{4}$ of the state's farmland transitioned to forests. The 1960s to the 1980s also saw a decline in population and an overall rise in housing development (Frederic). Even today, Auburn's population is lower than it was in 1960. Since 1973, when an early aerial

photographic survey of Auburn's AGRP was conducted, the landscape of Auburn has changed greatly. Golf courses have replaced forested regions, residential development has increased and the overall amount of field area in the Ag Zone has decreased. There are a wide variety of practices that residents and landowners of the area utilize, such as potato farming, animal husbandry and large scale composting.

Today, Auburn looks and functions on a different scale than it did in 1964, thus it is important to consider how land cover has changed over the decades and the potential zoning and policy alternatives that could be implemented to update and provide more contemporary relevance to the Agriculture and Resource Protection District. Agricultural production has experienced an overall decrease, with cattle, poultry and dairy production barely remaining. On the other hand, vegetable production in the area has risen (Meter and Goldenberg). Among some groups in Maine, such as a veterans' project with members in Auburn, there is an increased desire to farm in somewhat of a "village style," where families can live in close proximity to each other and farm acreage together. With a push for these types of communal agriculture spaces, there is a need for change in the current zoning regulations. The city council also wishes to see a strengthened local food system with the addition of a Community Agriculture Board and establishing bigger community gardens beyond the two plots that already exist downtown (Ad Hoc Committee, 10). Some of the problems to consider when addressing the potential changes in this district include: aging farming houses/buildings, limited food processing facilities, limited capital, limitations of Maine seasons and variation of soil throughout the Ag Zone, as well as limited interest in buying from local farmers (Meter and Goldenberg).

Working with the Auburn Conservation Commission and other interested members of the Auburn community, mostly under the direction of Chris Carson, a Bates alumnus, Bill Sylvester, and Maurice Keene, our Bates Capstone group surveyed the changes in Auburn's land cover since 1973. Using the information provided by our partners as well as independent research, we established a better understanding of how the current AGRP's current land cover came to be, and what zoning alternatives might be applicable. In particular, we looked at Transfer of Development Rights, Concentrated Development and Limited Development, or defaulting to the highest and best use. All of these alternatives and their applicability to Auburn will be examined in our Results section.

Our specific aim is to provide our partners at the Auburn Conservation Commission with classified maps, demonstrating Auburn's land cover changes since 1973. With this information, we will propose potential alternatives, or approaches, to rezoning and reconsidering the land use in the AGRP. Our three specific objectives are as follows:

Objective 1 - To identify the geographical, physical shifts in Auburn's landscape since 1973, through maps as well as numerical data, such as the shifts in acreage of forest, development and open fields.

Objective 2 - To work in collaboration with the Auburn Conservation Commission and other stakeholders in identifying the multiple ways the Ag Zone has been utilized by the various resident that live there.

Objective 3 - To identify the benefits, and applicability to Auburn, of different regions' land zoning alternatives that emphasize the protection of vital farmland and natural resources.

Methodological Approach

In order to determine how land cover has changed from the 1970s to today, we gathered aerial photos of Auburn from 1973 and analyzed the photographs using ESRI's ArcGIS software. With the help of Camille Parrish, Lecturer in Environmental Studies at Bates, our Capstone group stitched together 36 aerial photographs from 1973 to create a single aerial photograph of Auburn as it was in 1973. Using ArcGIS' image classification tool, we categorized all of Auburn's land as either water, forest, field, or developed land. Areas classified as water were any rivers, lakes, larger streams or wetlands. Forest included all land areas which were densely or somewhat densely covered by trees. Fields were open space, primarily covered by grass or other low-lying vegetation. Any land covered by impervious surfaces, such as buildings or roads was considered developed land. Land which is cultivated, such as golf courses, while arguably developed, was classified as field. After categorizing the entire map of Auburn into the four different land cover categories, we analyzed what percentage of Auburn was covered by each of the four categories of land cover.

With our 1973 land classification numbers calculated, we began to repeat the process with aerial imagery taken in the spring of 2018 by Maine GeoLibrary Board which conducts regional flyovers every 5-years. Using the Maine Orthoimagery Regional 2018 public files, with the help of Tom Lynch, the Maine State GIS Administrator, we stitched together a single georeferenced raster of Auburn as it appeared in 2018. Using this current-day photograph, we analyzed Auburn's current land cover again using ArcGIS's image classification tool with the

same land cover categories and values used in the 1973 map. This classification process yielded a table which shows what percentage of Auburn is currently covered by each of the four types of land cover for both 1973 and 2018. Using this data, our group was able to comprehensively analyze land cover change for Auburn, creating graphs showing how each classified land use has shifted since 1973.

In addition to the computational work which our project involved, we spent time researching the history of Auburn's AGRP District and other similar programs in different geographic areas. Utilizing the expertise of many local stakeholders, we collected information, stories, and anecdotes about the Ag Zone and life in Auburn's farming communities. Thanks to our community partners Chris Carson and Bill Sylvester, we were able to tour several different agricultural operations in the Ag Zone. We toured Bell Farms and met with David Bell, a potato farmer in Auburn, as well as Kathy Shaw, an Auburn farmer and the proprietor of the 4 Seasons Farm Market. We also toured Bill Sylvester's Auburn forestry operation and Michelle Melaragno's Compassionate Composting business. Meeting people that utilize the Ag Zone was informative in our consideration of what alternatives might be most relevant for Auburn residents and Ag Zone stakeholders.

Results and Discussion

Results from Mapping Data

The mapping data included in the figures below provide a lot of information on land changes in Auburn and in the Ag Zone. There are a few key points from this data. Firstly, the overall area of the Ag Zone has decreased, from 24,339 acres in 1973 to 19,421 acres today. The area of the town of Auburn has not changed. Secondly, developed land in Auburn increased 16% from 1973 to 2018. This is despite the fact that Auburn's population declined by approximately 5% from 1970 to 2016. Thirdly, in both Auburn and the Ag Zone, forest area has increased while field area has decreased (Figures 4 and 5). Overall, these numbers tell a consistent story: development in Auburn has increased substantially, especially relative to population, though development has been staunch in the Ag Zone. Additionally, both inside and outside the Ag Zone, fields have been replaced by forest, possibly reflecting a lack of farming activity.

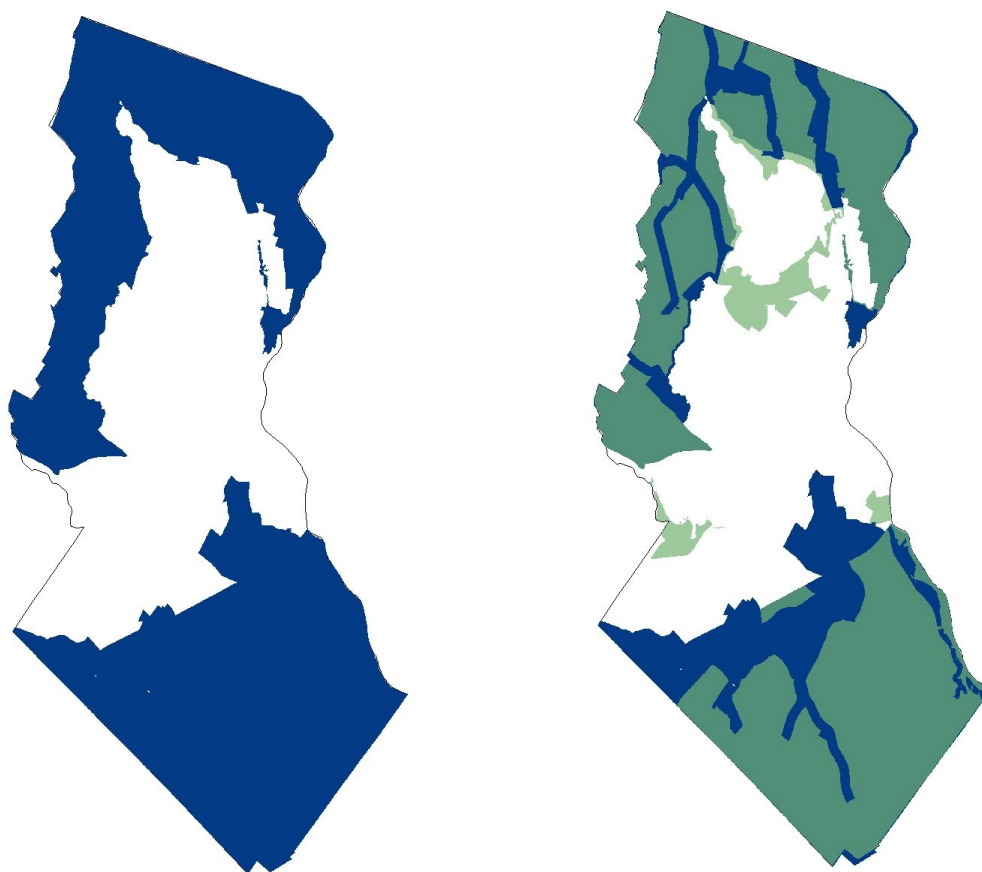


Fig 1: Boundaries of 1973 Ag Zone (left), 2018 Ag Zone Superimposed on 1973 boundaries (right).

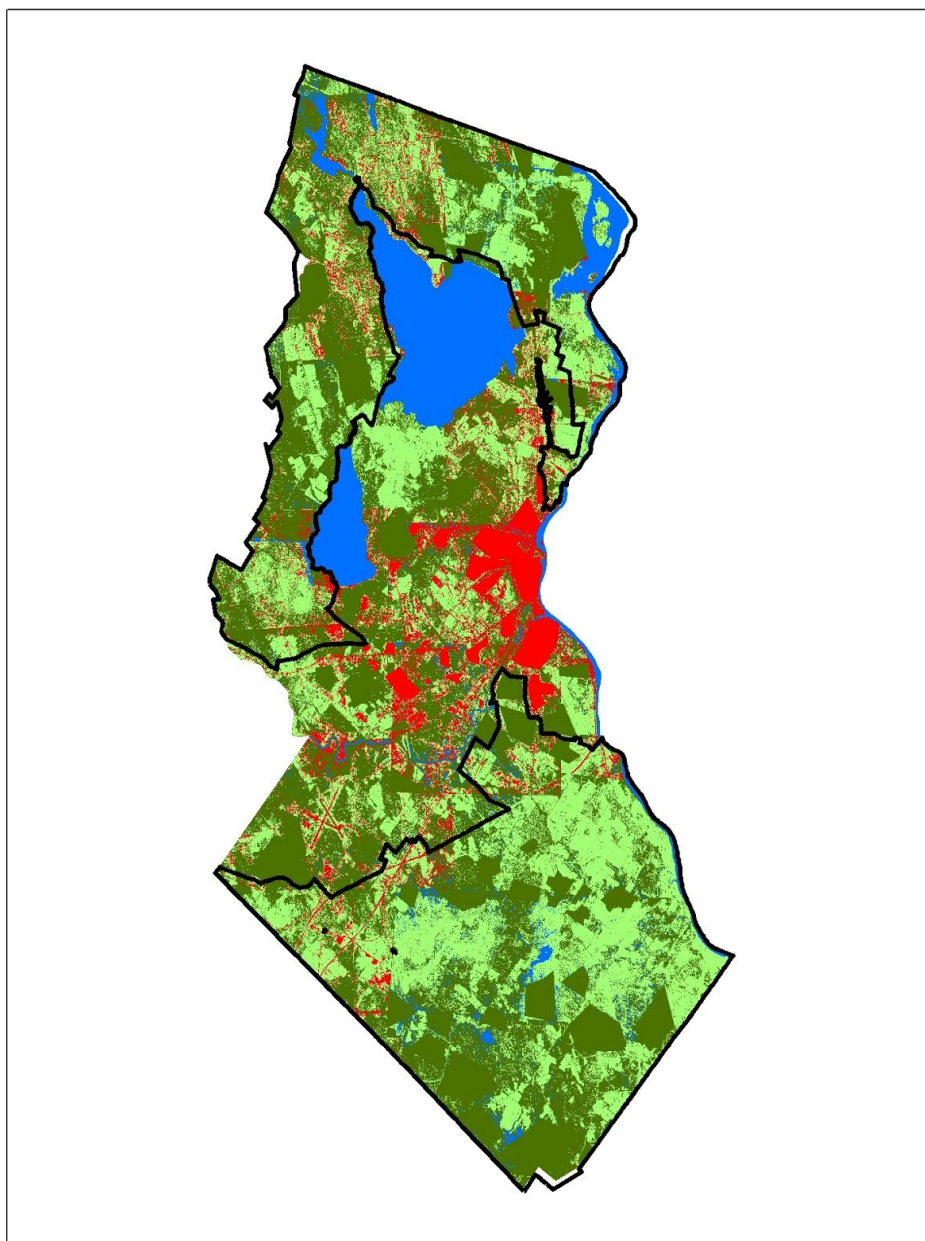


Figure 2: 1973 Auburn Land Cover

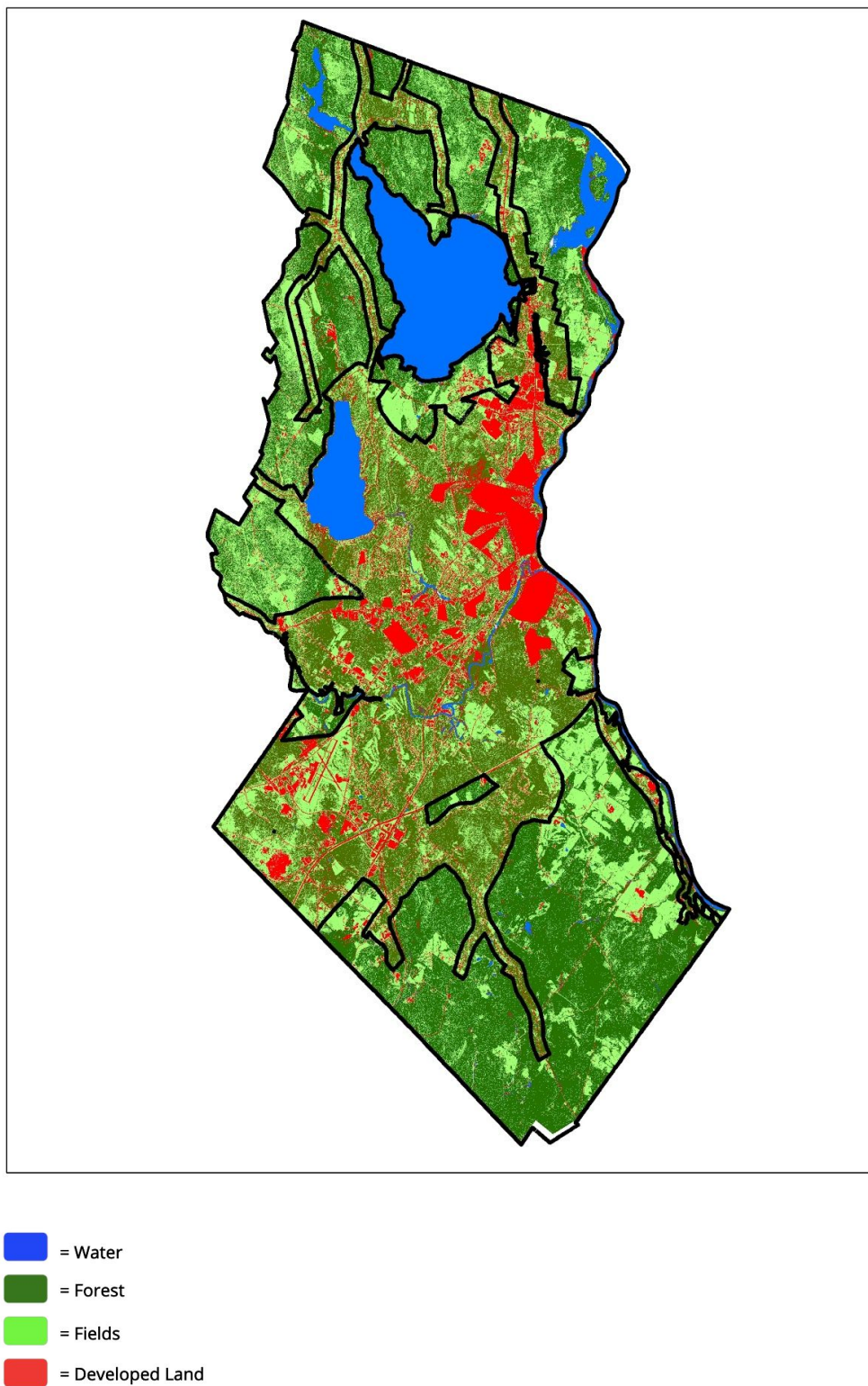


Figure 3: 2018 Auburn Land Cover

<u>Land Type</u>	<u>1973 Acreage</u>	<u>2018 Acreage</u>	<u>Percentage Change</u>
Forest	19,343	21,010	9%
Fields	13,922	12,370	-11%
Developed Land	4,023	4,655	16%

Figure 4: Land Cover and Acreage, 1973 and 2018, City of Auburn

<u>Land Type</u>	<u>1973 Acreage</u>	<u>2018 Acreage</u>	<u>Percentage Change</u>
Forest	13,186	12,068	-8%
Fields	10,002	6,587	-34%
Developed Land	1,151	766	-33%

Figure 5: Land Cover and Acreage, 1973 and 2018, Auburn Ag Zone

<u>Land Type</u>	<u>1973 Acreage</u>	<u>2018 Acreage</u>	<u>Percentage Change</u>
Forest	6,157	8,901	45%
Fields	3,920	5,758	47%
Developed Land	2,872	3,874	35%

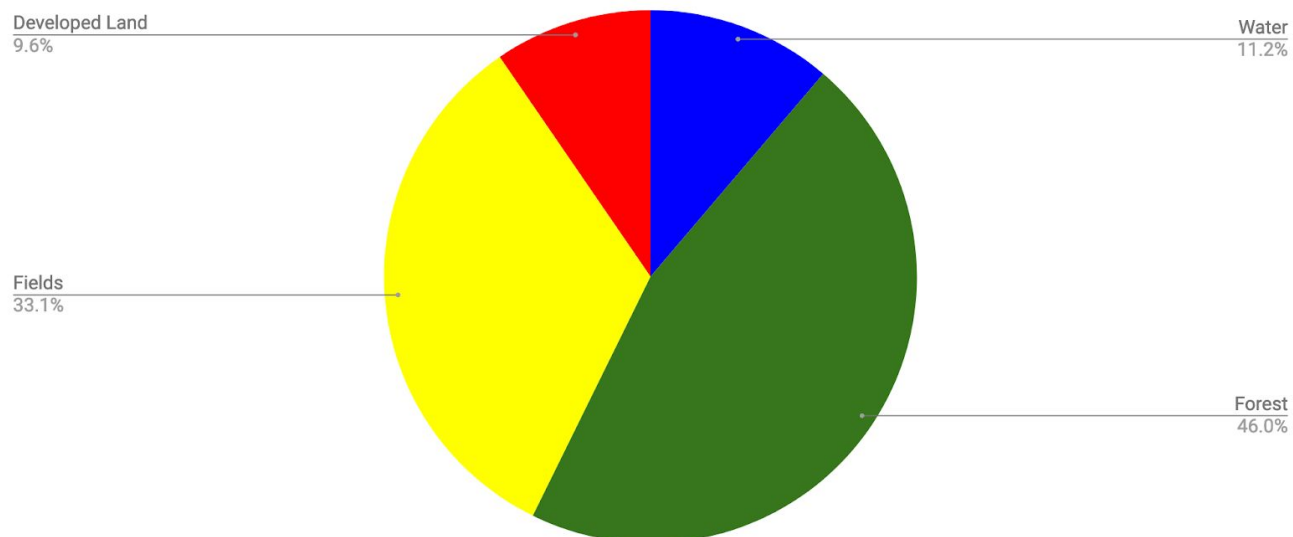
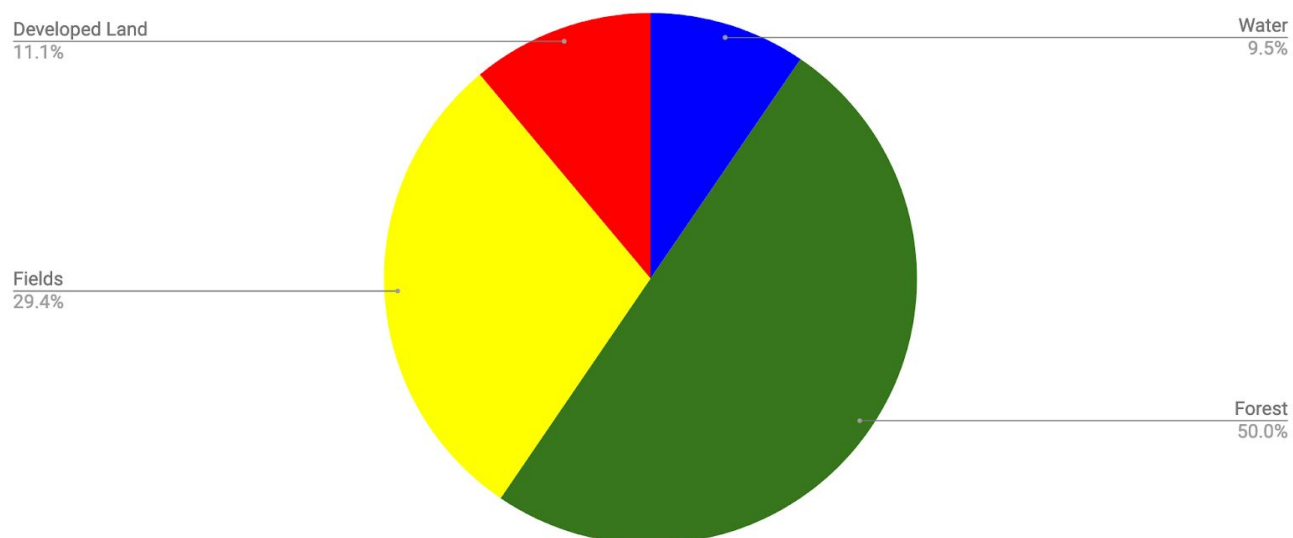
Figure 6: Land Cover and Acreage, 1973 and 2018, Auburn Non-Ag Zone area

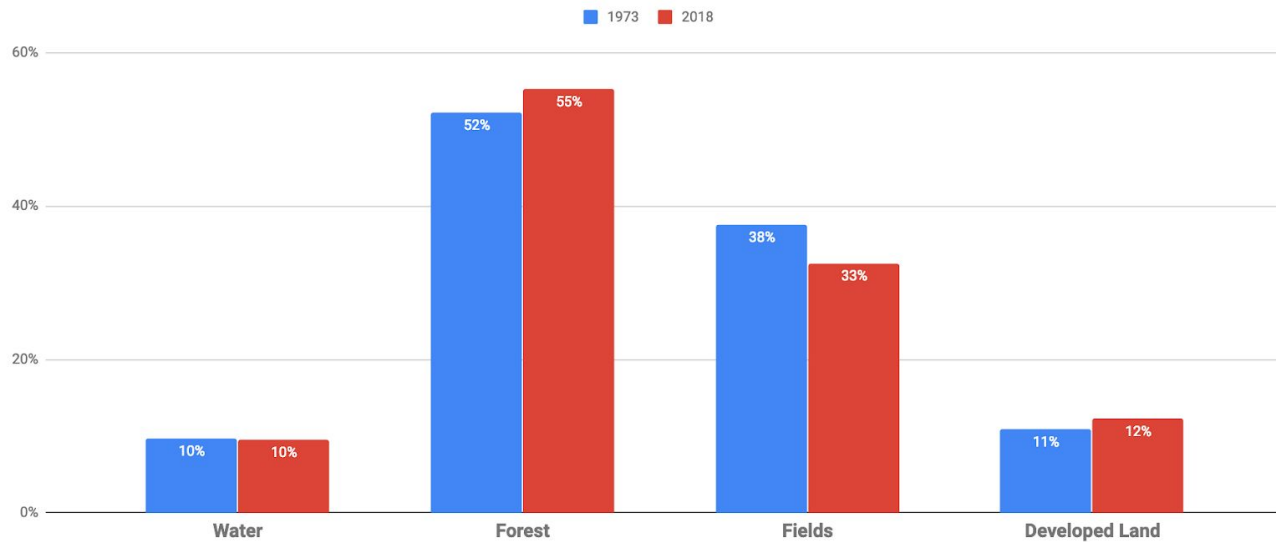
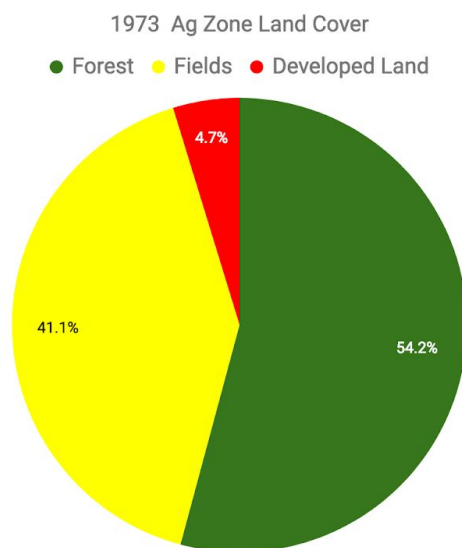
The figures below (Figures 7-17) show changes throughout Auburn and the Ag Zone from 1973-2018. Figures 7 and 8 show the different land cover data from 1973 and 2018. In these figures, water has been included as a category, but the differing water numbers is partly due to slight discrepancies in our data and classification, which caused some error. For this

reason, most of our analysis has omitted water as a category of land cover and only the *land* is considered (i.e. forest, fields and developed land). Figures 7 and 8 show the same changes which were mentioned earlier: an increase in developed land, a decrease in fields, and an increase in forest.

Developed land increased throughout Auburn, but as figures 10 and 11 show, developed land is a smaller percentage of the Ag Zone today than it was in 1973. This is because the boundaries of the Ag Zone have been adjusted substantially since 1973. In particular, the addition of rural residential zoning means that most of the development in the area which would be Ag Zone has been rezoned, causing a small decrease in the Ag Zone and an increase in development in Auburn.

Land cover outside the Ag Zone has significantly more development in both 1973 and 2018 than the area inside the Ag Zone (figures 12 and 15). This is to be expected. The percentage of developed land in the Ag Zone has not changed nearly as much as the land outside the Ag Zone. This finding suggests that the Ag Zone has been effective in its goal of reducing development -- though the changes to zoning, particularly the addition of rural residential areas, undermines this conclusion a bit.

1973 Auburn Land Cover**Figure 7: Land Cover in Auburn, 1973****2018 Auburn Land Cover****Figure 8: Land Cover in Auburn, 2018**

1973 v. 2018 Auburn Land Cover**Figure 9: 1973 vs. 2018 Auburn Land Cover****Figure 10: Land Cover in Ag Zone, 1973**

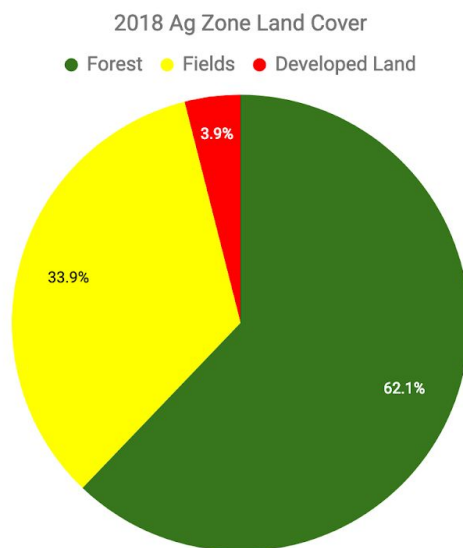


Figure 11: Land Cover in Ag Zone, 2018

1973 v. 2018 Ag Zone Land Cover

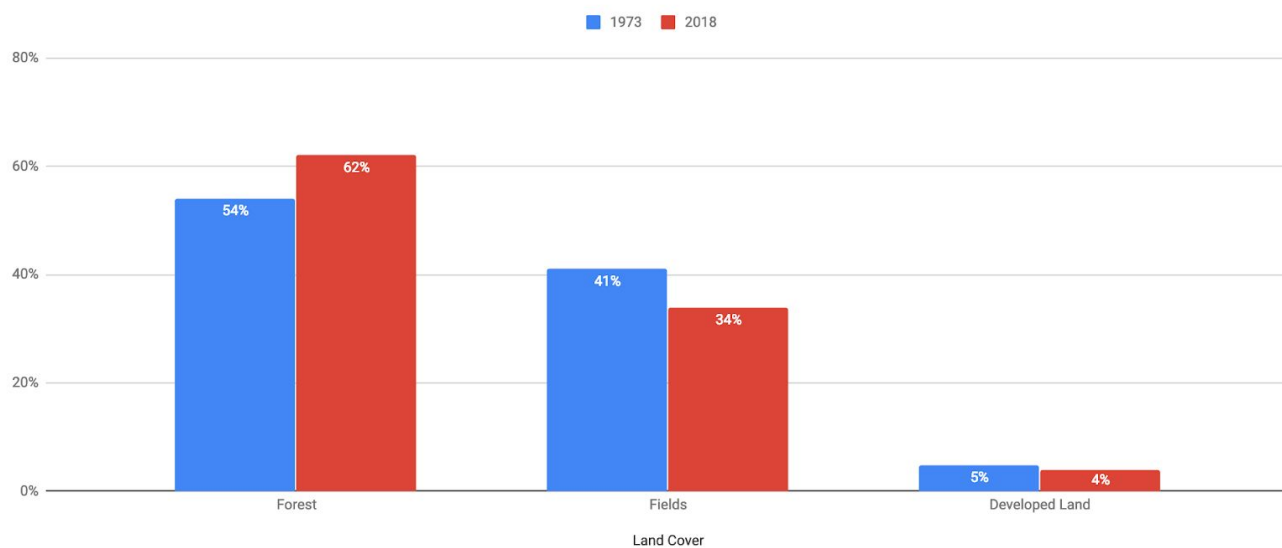


Figure 12: 1973 vs. 2018 Ag Zone Land Cover

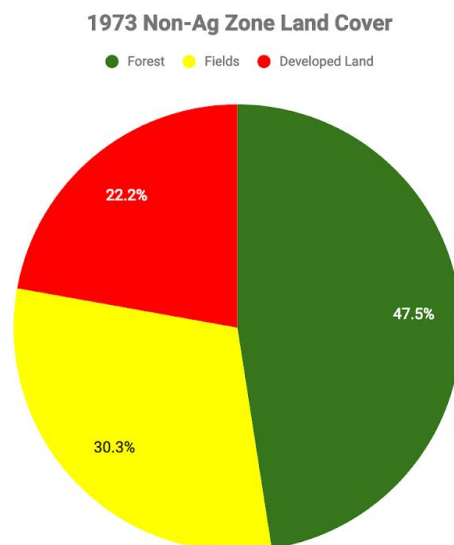


Figure 13: Land Cover in Non-Ag Zone area, 1973

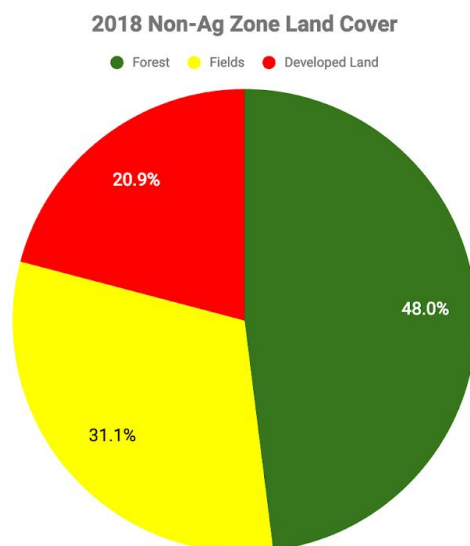
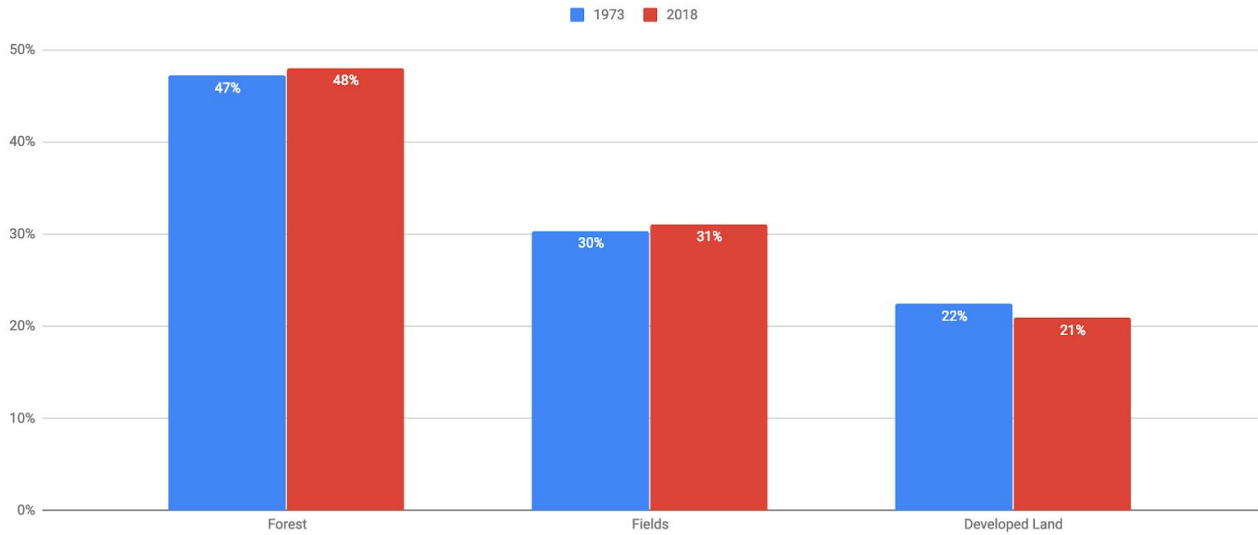
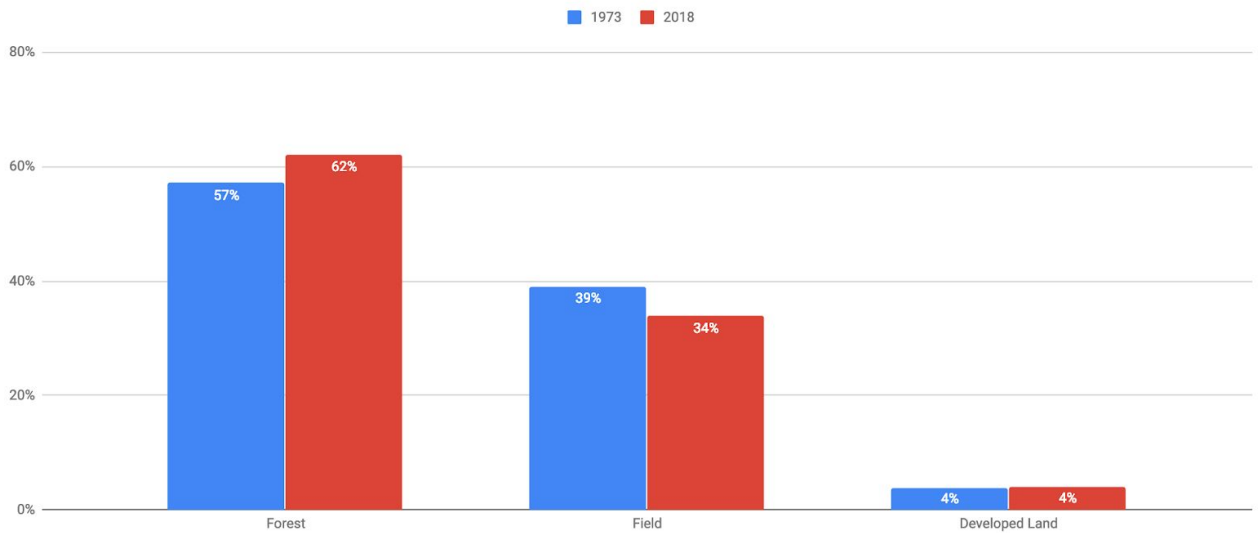


Figure 14: Land Cover in Non-Ag Zone area, 2018

1973 v. 2018 Non-Ag Zone Land Cover**Figure 15: 1973 vs. 2018 Non-Ag Zone Land Cover****1973 v. 2018 Land Cover on 2018 Ag Zone****Figure 16: 1973 vs. 2018 Land Cover, on 2018 Ag Zone**

1973 v. 2018 Land Cover on 2018 Non-Ag Zone

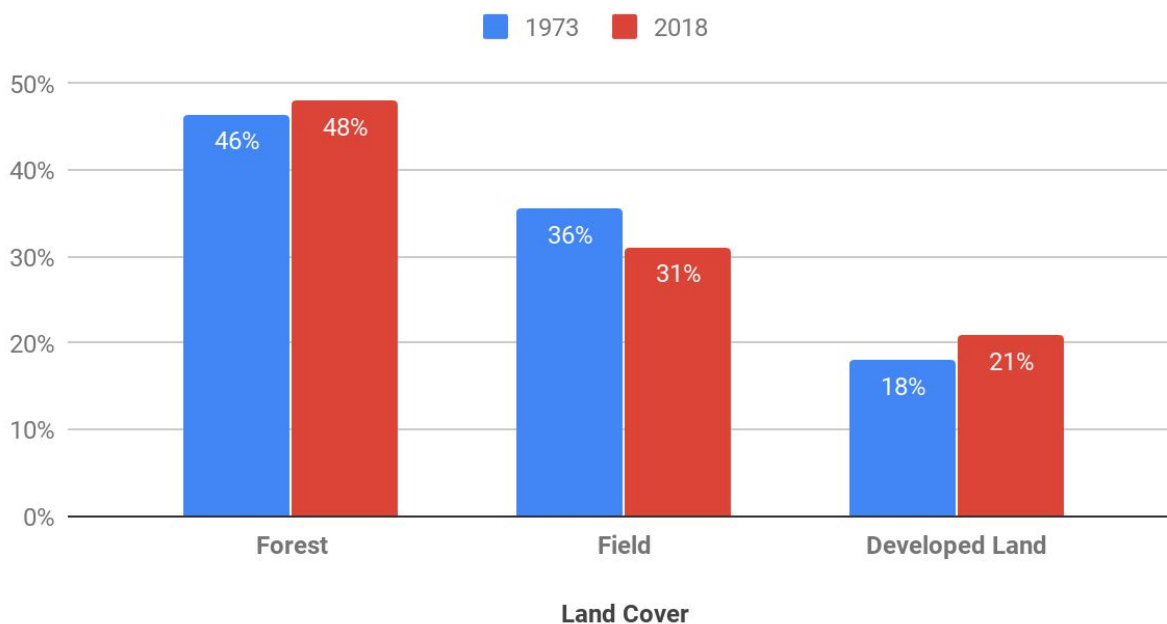


Figure 17: 1973 vs. 2018 Land Cover, on 2018 Non-Ag Zone

Figure 9 shows the general changes in Auburn land cover between 1973 and 2018. Forested land, as a percentage of Auburn, increased slightly from 1973 to 2018, while fields saw a slightly larger decrease in raw percentage. Developed land also increased, by 16% (Figure 18). This is consistent with the general theory that development has increased as fields have reverted to forested area.

Figure 12 depicts land cover changes in the Ag Zone. It is important to note that this is comparing the 1973 Ag Zone with the 2018 Ag Zone, so it is not a direct comparison. This discrepancy will be addressed further on in this report. Again, forests maintain a greater percentage of the Ag Zone land than in 1973 while fields are a smaller percentage. Developed land appears to have decreased, though as the area of developed land increased in Auburn

overall, we can tell that this is because of the changed boundaries of the Ag Zone. As was mentioned before, this is primarily due to the increase in rural residential zoning. Refer to figure 1 to see the changing Ag Zone boundary.

Figure 15 shows land cover changes in Auburn in the area that is *not* in the Ag Zone. Again, these data show the Ag Zone from the two different eras, and thus it is not a direct comparison. Outside the Ag Zone, the percentages of land cover have not changed much. Thus, the overall composition of the area outside the Ag Zone is similar to how it was in 1973. Note that development is a much larger percentage of the non-Ag Zone area than the Ag Zone area in both 1973 and 2018.

Because the Ag Zone boundaries have changed since 1973, it is not possible to directly compare land cover inside and outside the Ag Zone. To remedy this, we have analyzed the land cover within the 2018 Ag Zone in both 1973 and 2018. This allowed us to directly compare land cover in 1973 and 2018.

Figure 16 depicts land cover changes between 1973 and 2018 in the area of the 2018 Ag Zone. Very little land has been added to the Ag Zone since 1973. Rather, land has mainly been rezoned and removed from the designated Ag Zone, thus the land analyzed is mostly within both Ag Zones. As shown in figure 16, the percent of the 2018 normalized Ag Zone which is developed land has stayed nearly constant, at about 4%. Figure 17 conveys the land cover change between 1973 and 2018 in the area outside of the 2018 Ag Zone. Figure 17 shows a 4.7% increase in forest in this area, an 11.5% decrease in field, and a 17.4% increase in development. Framed in the context of a falling Auburn population, this is a significant increase in developed land.

<u>Land Type</u>	<u>Percentage Change in Auburn</u>	<u>Percentage Change in Ag Zone</u>
Forest	9%	-8%
Fields	-11%	-34%
Developed Land	16%	-33%

Figure 18: Percentage Changes in Land Cover in Auburn, between 1973 and 2018

Due to rezoning, a smaller percentage of the Ag Zone is covered by developed land today than in 1973. This demonstrates that the Ag Zone has been somewhat successful in mitigating development within its boundaries. Many people in Auburn would like to see some of the most restrictive parts of the Ag Zone laws changed to allow a greater scope of economic activities. Figure 26 shows a map of Auburn with different parcels and their development potential. Just because these parcels are vacant does not mean that they necessarily should be developed, but this map gives an idea of where some development might occur. Allowing a broader scope of economic activities in the Ag Zone could bring benefits to Auburn and the town's residents without severely impacting the existing non-developed area.

City of Auburn
Draft Analysis of Ag Zone Parcels Available for Development

Class	# of Parcels	% Ag Parcels	Average Acres	Total Acres	% Ag Parcel Acres	Average Road Frontage	Total Road Frontage
Vacant Parcels, > 10 acres, > 250 ft Road Frontage	100	13%	51	5,139	27%	1,290	125,137
Occupied Parcels, > 20 acres, > 500 ft Road Frontage	57	7%	64	3,684	19%	1,942	110,671
Vacant Parcels, > 3 acres, Any Road Frontage	10	1%	20	200	1%	144	1,437
Landlocked Parcels within Ag Zone	99	13%	20	1,949	10%	0	0
Parcels with no Road Frontage in Ag Zone, possible frontage other zone	143	18%	24	3,389	18%	0	0
Vacant or Occupied Parcels, don't meet dimensional standards	224	29%	5	1,215	6%	522	116,942
Other Parcels*	149	19%	23	3,461	18%	500	170,127
Total	782			19,037			

*City, Commercial, Land Trust, Utility Owned Parcels & Parcels without enough acreage or road frontage

Fig 19: Parcels Available for Development in Auburn's Ag Zone

Information from "Final Report Study to Support and Enhance Auburn's Agricultural and Resource Sector" 2018

In addition to our own classification of Auburn's Ag Zone, we also looked at the recent work of Crossroads Resource Center. In October 2017, the City of Auburn commissioned Crossroads Resource Center, a nationally recognized consultant service, to study the Auburn Ag Zone and its local context, to interview community stakeholders, and to make written recommendations. Though this work was similar to our own, the maps of land cover convey data gathered in 2013, while our report examines data from 2018. The data that Crossroads gathered on land cover is depicted in Figure 20.

In the *Final Report Study to Support and Enhance Auburn's Agricultural and Resource Sector*, published in 2018, the City of Auburn listed problems with the Ag Zone regulations now.

Some of these problems include the requirements for building a new house, and how 50% of one's gross household income must come from agriculture or resource extraction. Additionally, to build a new house, at least 10 acres must be available for a "houcelot" to exist (Ad Hoc Committee, 5). In this report, they also suggest that the City of Auburn form a permanent residents' body to address the ongoing needs of protecting farmland, forestry businesses, woodlots, and building a stronger food, agricultural, and resource economy in Auburn (Ad Hoc Committee, 11). It is also interesting to note that currently, the largest source of net farm income is renting out land to others who farm, not actually producing crops and livestock.

This report also noted the priorities of the Ag Zone and potential activities for the Ag Zone to incorporate. Some of the goals of the Ag Zone include protecting open space, strengthening the agriculture and natural resource sector, protecting farmland for agricultural uses, educating the community about agriculture's contribution, and the protection of natural environments with special emphasis on Lake Auburn (Ad Hoc Committee, 4).

Some of the activities listed in this report are also important to consider in conjunction with our own findings. The 2018 report suggested that the Ag Zone incorporate activities such as agritourism, wind and solar farms, greenhouses, incubator farming programs and a Voluntary Municipal Farm Support Program that allows for tax incentives and increased investments (Ad Hoc Committee, 4). Lastly, it is critical to note that while Auburn residents spend about \$66 million each year purchasing food, nearly all of this is sourced from outside the city.

Agricultural Mapping Data			
Soils	Acres		
	Entire Town	Ag Zone	
All prime farmland	4205	1289	7%
Farmland of Statewide Importance	9856	4221	22%
		5510	29%
Land Cover			
Zone	Land Use	Acres	
AG	Crop	2429	13%
	Open	1494	8%
	Developed	657	3%
	Forested	13939	74%
	Gravel Pit	194	1%
	Recreation	217	1%
Total		18931	100%
LDCR	Crop	206	11%
	Open	166	21%
	Developed	389	21%
	Forested	998	55%
	Gravel Pit	52	3%
	Recreation	10	1%
Total		1822	112%
RR	Crop	298	5%
	Open	600	10%
	Developed	1145	20%
	Forested	3550	61%
	Gravel Pit	1	0%
	Recreation	233	4%
Total		5826	100%

Figure 20: Auburn's Land Cover, by Crossroads Resource Center, 2018

Mitigating Land Use Conflicts: Results from Research of Alternative Approaches for Bridging Tensions Between Conservation and Development

Cities and towns across the country are in conversation about the future of undeveloped land and the conflict between development and conservation efforts. In this report, a variety of land use alternatives are examined, particularly looking at how such alternatives may be implemented in Auburn's Agriculture and Resource Protection District. After preliminary

research, it was determined the most prevalent examples of land use control methods are cluster development, transfer of development rights (TDR), and rezoning proposals. This report does not make a formal recommendation on which of these land use alternatives would be the best fit in solving Auburn's contentious relationship with the future of the Ag Zone. However, it should be noted that this research provides foundational information in thinking about what may be the best practice in protecting the vast natural resources of Auburn, encouraging economic growth and promoting Auburn residents' access to land.

Land use alternatives can be used in conjunction with one another. In other words, the discussed alternative methods are not mutually exclusive. Because Auburn's Agriculture and Resource Protection District is unique in its scale and restrictions, and because Auburn residents' needs will vary from other cities and towns, adopting alternative plans or revisions to the current Agriculture and Resource Protection District will likely involve a combination of alternative practices to fit the contemporary needs of Auburn and its residents. Proposing changes to the current Ag Zone restrictions could involve selecting portions of policies, programs, and zoning restrictions which exist elsewhere and curating it to the specific needs of Auburn, Maine.

In the three selected land use alternatives: cluster development, TDR, and rezoning-information was gathered by examining how these methods have been either successful or unsuccessful in various cities and towns and the factors that contribute to a location's adoption or denial of new policies or programs. The most relevant cities and towns were in New England, including: Unity, Maine; Brunswick, Maine; Cape Elizabeth, Maine; Strafford, New Hampshire; Wellesley, Massachusetts; and Burlington, Vermont. In order to examine these alternatives in detail, as well as filling in the gaps from town and city archives and academic literature, we

created a formal set of questions for Unity, Maine selectmen and Burlington, Vermont city planners (see Appendix 6).

In addition to New England based research, our initial investigation of alternatives included regions in other parts of the country, including policies and programs in California and Wisconsin (see Appendix 4). The rubric used in conducting this research can be found in Appendix 3. Through the examination of regions farther away, we gained a more thorough understanding of the various approaches used in agricultural and natural resource protection. An overarching conclusion from our research was that the success of land use alternatives often relies upon support from local residents and collaboration with the variety of community stakeholders. In most cases, these changes to land use practices and policy do not occur overnight. Public forums, community input, educational opportunities, and incentives for residents are all components of a successful adoption of new land use policies, programs or rezoning efforts.

Cluster Development

Cluster development is a method of planning that incorporates both zoning and design strategy to clump houses on smaller lots in one area while preserving the remainder of the land for conservation, recreation, agriculture, or common open space (Eureka, 1). Cluster development protects a municipality's valuable land from urban sprawl, which is often a byproduct of traditional subdivision development. Traditional subdivision development is defined by post-World War II suburban development in which low interest loans sprouted a housing boom where more families than ever before could afford a home with their own

backyard (Göçmen). Traditional subdivisions are characterized by sprawl, maximization of development potential and high impact on local ecology and water systems. Cluster development allows for the creation of the same number of lots as would be found in a traditional subdivision but alternatively puts emphasis on minimal sprawl and low impact on surrounding ecosystems.

By enforcing developers interested in breaking down property to concentrate it, cluster development leaves space for active conservation within the property. Cluster development often relies on the developer putting an easement on the property allocated as conservation space to ensure its protection forever. With cluster development, the number of lots available is typically equal to the amount of lots in a traditional development scheme which is of great value to the prospective developer. While the same number of developed lots exists on a parcel, in a cluster development plan, these lots are built in a more concentrated area, leaving large sections of the parcel set aside for conservation. Examples places where cluster development has been successful is in Strafford, New Hampshire and Wellesley, Massachusetts.

Wellesley is an example of a town where cluster development has been in the minds of town planners since the 1970's, with initiatives to preserve Wellesley's surrounding forest area from increasing pressure to develop. In 2011, Wellesley, Massachusetts attempted to extend the cluster development rule (Allen). This initiative to extend was a result of the efforts of community group, the Friends of Brookside, an association of Wellesley residents dedicated to protecting and preserving the area with the help of the local Planning Council. Public forums were held but no additional cluster development provisions were adopted due to resistance from members of the public who thought the stricter rules on development would negatively affect property values of individual lot owners.

Strafford, New Hampshire has an effective cluster development plan set by the Strafford Regional Planning Commission which provides educational packets on the benefits of cluster development to the public. Strafford's argument for cluster development is that it is a win-win-win scenario for developers, lot purchasers, as well as the environment. For developers, incentives for cluster development include lower upfront and upkeep costs because compact development requires less infrastructure such as shorter streets, less utility lines, and stormwater management. Lot purchasers have access to an expansive green area and pedestrian safe neighborhoods. The environment benefits as local ecosystems can continue to thrive on the conserved land and local water sources will be more protected as less non point solution will be running off lawns and roadways which are smaller in a cluster development plan (*Promote Open*, 2).

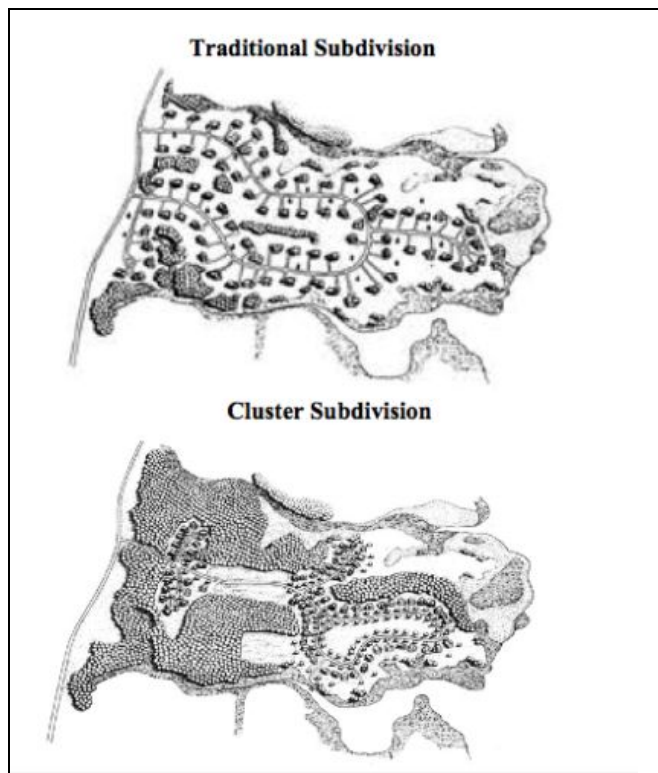


Figure 21: Traditional vs. Cluster Subdivision (“Cluster Development”)

Cluster development can have positive effects beyond simply protecting and conserving a municipality's natural resources. It often provides accessible green space for people moving into the subdivision, which may also result in positive effects on residents’ mental and physical health. This may also change residents’ perspective on engaging with the outdoors as well as the town, or city, they live in. Auburn can learn from other New England cities and towns that have cluster development plans in place. As seen in Wellesley, Massachusetts struggled to extend the scope of cluster developments rules on subdivisions due to a concern on an economic hit for the town. Wellesley’s interest in cluster development stems from conservation groups which, although important, can sometimes fail to address the greater communities concerns. Strafford, New Hampshire has mitigated these issues and had success with its cluster development plans

through creation of accessible educational pamphlets for the public and substantial community outreach explaining how cluster development plans can benefit developers and lot purchasers in addition to the environmental incentive. Strafford's success comes from strong leadership from the local planning commission. If Auburn's expansive Ag Zone were to lessen restrictions on development within the District, putting in place a cluster development plan for subdivision of larger parcels could prove beneficial in meeting economic interests in development while also preserving large expanses of rural Auburn through conservation easements.

Transfer of Development Rights (TDR)

Transfer of development rights (TDR) is a type of program in which municipalities limit development in particular areas in a town or cities boundaries that have been identified as high priority for a particular use. The definition for TDR, as well as other key concepts can be found in Appendix 2. In the context of Auburn, a TDR program could be adopted by identifying highest concerned areas for conservation, agriculture, recreation, or open space and then selecting ideal places for concentrated development. Landowners within areas of high priority for agriculture and conservation could then sell property rights to the city, in turn making money through protection of the land. The city or town then sends interested developers to the properties designated for development where they can purchase development rights or density credits that exempt them from previous restrictions (i.e. height, number of lots, density, etc).

The town of Unity, Maine adopted a transfer of development rights program which is known as the Farmland Protection Incentive Measure (Maine State Planning Office, 20). For the case of Unity, although a TDR Program has been implemented and a "preferred development"

and “limited development” zones put in place, in conversation with selectmen, there seemed to be a disconnect between what happens in Unity with TDR Programs (i.e. a question about TDR would be posed and a respondee would say, no that does not exist, and would then go on to define TDR but instead referring to it as Unity’s name of the Farmland Protection Incentive Measure). In Unity, a town largely defined by its rich agricultural history, as it is home to the Maine Organic Farmers and Gardeners Association, the Common Ground Country Fair, Unity Food Hub, and one of the main offices for Maine Farmland Trust, it is unsurprising to see prioritization of the protection of farmland and natural resources. Although the Farmland Protection Incentive Measure is in place, most of Unity’s farmland and natural resources is already preserved based on the towns commitment to its agricultural history. If a new developer was interested in building on parcels in Unity, they would be required to provide assistance to farmers or landowners through purchase of easements or set aside conserved land of their own (“Land Use Ordinance”). Unity is a strong example of how a culture of prominent agriculture and resource protection can be effective in preserving land forever through easements and TDR.

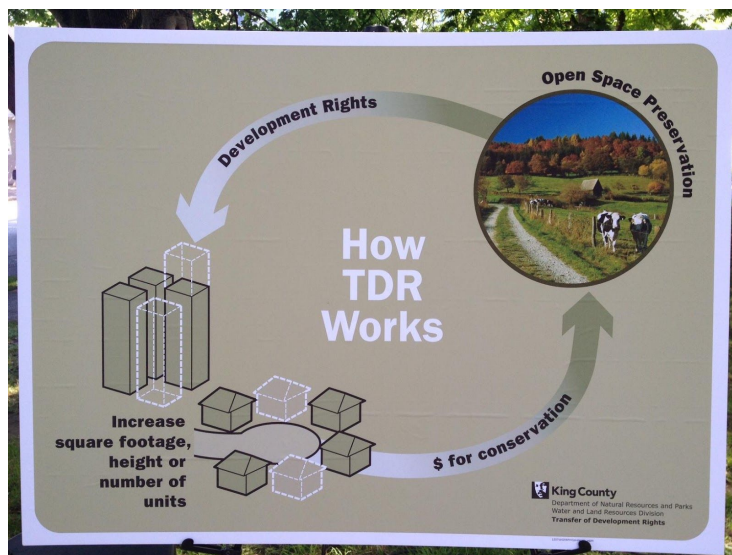


Figure 22: How TDR Works, King County, Washington (Pailthorp)

No TDR Programs currently exist in Auburn and although easement options are available for Auburn Ag Zone residents from Maine Farmland Trust, Androscoggin Land Trust, and other outside qualified entities, the incentive does not exist for landowners. These landowners already benefit from a similar tax cut that is provided simply by being a resident of Auburn's Ag Zone. This explains why nearly no conservation easements exist in Auburn's Ag Zone, which means the properties in the district are susceptible to development if zoning regulations change. The benefit of easements and TDR Programs is that, once development rights are sold or an easement is put in place, the land will forever be protected by these regulatory measures. The Ag Zone currently effectively does what easements and TDR Programs aim to do but is subject to change and susceptible to having prime conservation land re-zoned or developed.

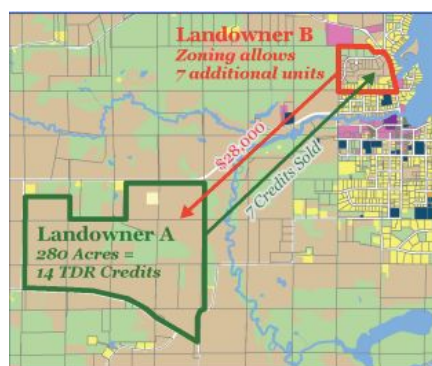


Figure 23: TDR Example, University of Wisconsin Center for Land Use Education (Miskowiak, 1)

Municipalities can also establish ordinances that create growth caps and impact fees in selected areas as a means of discouraging development. Potential conflicts that arise are that rules are set in place and then become flexible when a stakeholder offers enough money. This means that high priority conservation or agricultural areas may be susceptible to change based on a high price tag. Although TDR and easements are voluntary based programs, they do provide monetary incentives for landowners that additionally become long term solutions focused on the vitality of the land and its rich natural resources.

Auburn could benefit from the adoption of a TDR Program as a means of mitigating urban sprawl which has already been displayed through the loosening of development rules along roads and creeping rural development to the south of I-95. If Auburn were to move towards the adoption of a TDR Program, they would need to take significant steps to educate residents of the option of a TDR and what this means for them.

Rezoning

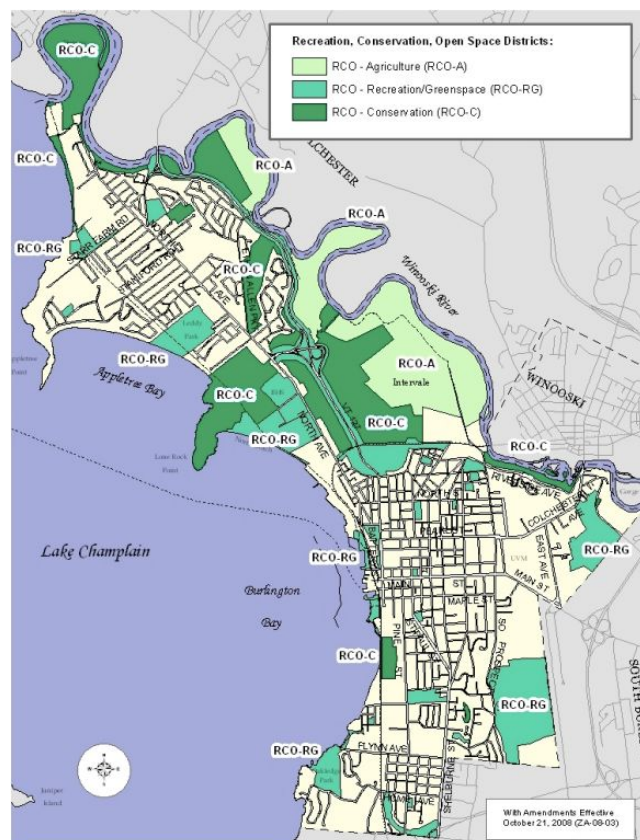


Figure 24: Burlington RCO Zoning Map, 2008 (Department of Planning and Zoning)

Using insight from cities such as Burlington, Vermont, Auburn could consider rezoning of the Ag Zone to fit more contemporary needs of the city. In the early 1970's Burlington, Vermont had *one* large Recreation, Conservation, and Open Space District (RCO). But, due to so many activities being encompassed by one district, regulations were difficult to implement so Burlington decided to divide the RCO into three subdistricts: RCO: Agriculture, RCO: Recreation/Greenspace, RCO: Conservation (Department of Planning, 48). In addition to writing rules and regulations which best fit these three individual subdistricts, Burlington also set aside an Urban Reserve along prime real estate on the shore of Lake Champlain. The city holds onto the Urban Reserve waiting to determine the best course of action for the property: should it be

developed and the money accrued be used to benefit the city? Or should it be preserved for shoreline protection? Although Burlington is about a quarter of the size of Auburn and double the population, the percent of its land locked away in conservation-oriented zoning is similar to Auburn, thus making it a strong guiding example.

Burlington's RCO Districts have been supported by the city's residents as the sub-districts have brought community opportunities in forms of accessible and affordable local foods through the work of the Intervale Center, a non-profit that owns and operates community farm spaces and an educational facility in Burlington's RCO: Agriculture sub district as well as numerous, maintained recreational trails in RCO: Recreation/Greenspace. Burlington, Vermont's RCO Districts and Urban Reserve have effectively mitigated urban sprawl while also prioritizing conservation efforts and community opportunities in forms of recreation and garden spaces (Intervale Center).

Changes to Auburn's Agriculture and Resource Protection District do not need to mirror other cities or towns' choices in protecting natural resources. But, in understanding the variety of zoning regulations and the successes and roadblocks experienced by other towns, cities, and regions, there is a more robust argument for change in Auburn. Although Auburn's Agriculture and Resource Protection District is distinct in its scale and restrictions, adoption of more contemporary regulations and policies would benefit the city in the long term. The alternatives explored in this report can be altered and even combined to create a best fit for Auburn and its residents. For example, if Auburn chose to divide the Agriculture and Resource Protection District based on Burlington's RCO zoning strategy depicted in Figure 24, the city could create an Agriculture Zone, Recreation Zone, and Conservation Zone. These distinct zones would be

finite and protected from the impediment of urban sprawl on natural resources. Additionally, in rezoning, the city of Auburn could open up a portion of the current Ag Zone for development, but implement a cluster development rule for any developer hoping to subdivide the land into more than four lots. Land that would be subdivided into more than four lots would then require the developer to have a soil analysis of the property. Based on results of such analyses, the developer would then set aside an equal amount of the land for development and land to be preserved. Preservation can be through either an easement or contract with the city. With this hypothetical approach, rezoning, cluster development, and easements would be utilized to address the diverse needs of Auburn's residents and natural resources today, and in decades to come.

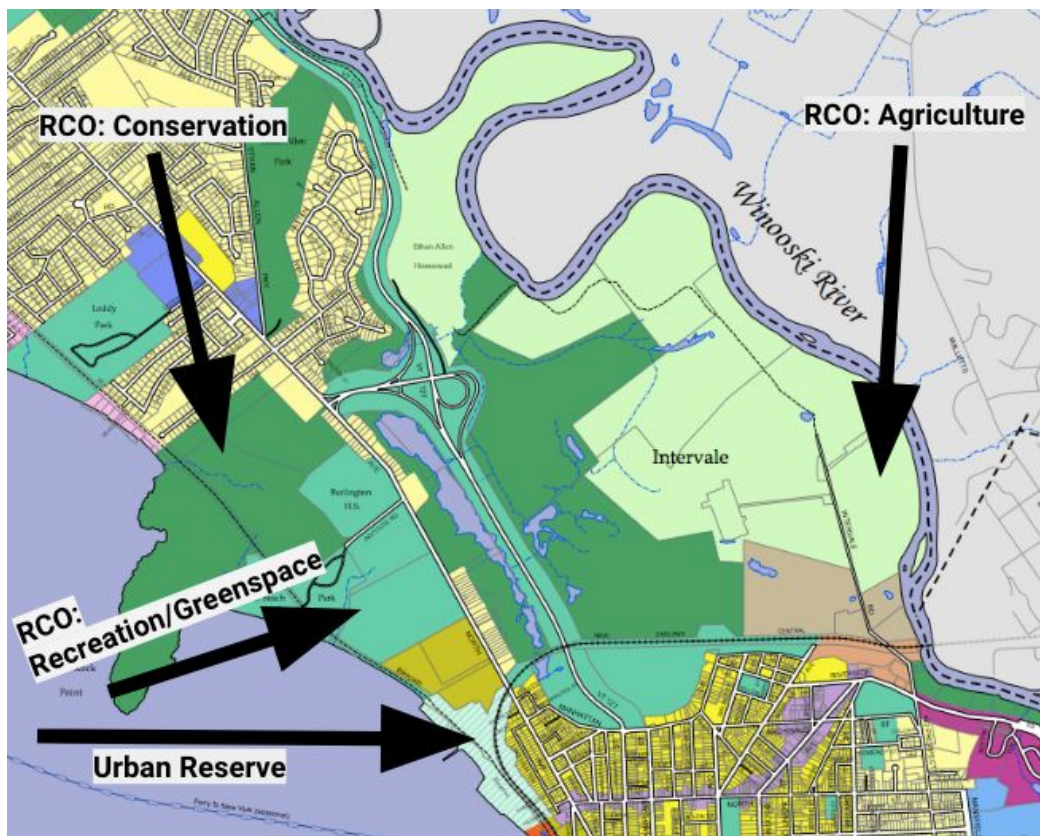


Figure 25: Burlington RCO and Urban Reserve Zoning Detail

With data on how Auburn's land use and land cover have changed since the 1960's, as is provided in this report, in addition to an inventory of soil, forest, and identification of priority conservation areas, the city of Auburn can better determine best fit alternative(s) to the existing Agriculture and Resource Protection District. Taking time to consider a method that most fully suits the needs of Auburn's residents and its large scope of natural resources is vital for the long term health of the city. Short term solutions, such as deregulation of the Ag Zone and allowance of any type of development, could have detrimental and irreversible effects on agriculture and forestry activity, as well as on the wealth of other natural resources that have been protected and untouched for so long.

Recommendations for Next Steps

Before concluding our results with future recommendations it is important to note the quality and completeness of our data remains in a working state. Because the quality of the 1973 aerial photography is much lower than the quality of the 2018 photos, there are inherent discrepancies in comparing the two, as noted in our Executive Summary. In other words, there remains a need to revisit, clean, and adjust the 1973 classification to ensure the utmost accuracy. Despite these small inconsistencies, the data and maps we have produced are in a condition that can be utilized and are helpful in examining overall trends and are foundational for future land use and land cover analyses. Additionally, the 2018 map of Auburn (the most recent aerial imagery available), in the form of one single photo, has been processed using the State of Maine's computer systems, and is now georeferenced for all future GIS projects involving classification analysis. It is also critical to note that the boundaries of the Ag Zone have shifted,

shrinking in overall size due to rezoning (see Figure 1). Because of the shift in acreage of the Ag Zone over time, there are clear differences in acreage numbers when comparing the two maps and the classification data.

Given the alternative approaches to agriculture and natural resource protection in places like Burlington, Vermont, Unity, Maine, and Strafford, New Hampshire, Auburn may move forward with ideas suggested in these variety of practices and potentially utilize them for future zoning regulations. However, it is important to consider that the alternatives mentioned are *not* mutually exclusive and may be adjusted and applied to fit the specific needs of Auburn.

Additionally, there are various recommendations listed in the “2018 Final Report Study to Support and Enhance Auburn’s Agricultural and Resource Sector” which we agree are valuable considerations in thinking about policy revisions in Auburn and specifically in the Ag Zone. These recommendations include revisions of greenhouse codes, implementation of solar/wind farms and promoting agritourism.

Looking ahead, the City of Auburn should consider committing resources to further analyze the foundational GIS classification and mapping done for this report. This could come in the form of the creation of a summer GIS internship position, a grant-based research team, willing and interested volunteers, or another community partnership with the Bates Environmental Studies Department. In order to suggest the best methods for managing the Ag Zone in the future, Auburn should fully evaluate land cover and land use changes. Thus, our findings are a solid foundation for future research on Auburn’s Ag Zone and potential alternatives to zoning and regulations.

Works Referenced

- Ad Hoc Committee, City of Auburn. *Final Report: Study to Support and Enhance Auburn's Agricultural and Resource Sector*. Ad Hoc Committee, 2018.
- Allen, Evan. "Wellesley Eyes Cluster Development to Preserve Open Space." *BostonGlobe.com*, Boston Globe, 6 Jan. 2013, www.bostonglobe.com/metro/regionals/west/2013/01/06/wellesley-eyes-cluster-development-preserve-open-space/5pkfdJxDEIzq7b66PKFXUJ/story.html.
- American Farmland Trust, and Farmland Information Center. "Cost of Community Services Studies." Sept. 2016.
- Andrew Rice. "Auburn Council Forwards Agricultural Zone Proposal." *Lewiston-Auburn Sun Journal*, Sun Journal, 26 Feb. 2019, www.sunjournal.com/2019/02/25/auburn-council-forwards-agricultural-zone-proposal/.
- Australian Securities & Investments Commission. "Land Banking." *ASIC's MoneySmart*, Australian Government: Australian Securities & Investments Commission, 3 Dec. 2018, www.moneysmart.gov.au/investing/investment-warnings/land-banking.
- Behrens, Zach. "Until the 1950s, Los Angeles County Was the Top Agricultural County in the U.S.!" *KCET*, 27 Feb. 2011.
- Blackwell, John T. "City of Auburn City Plan Report." Dec. 1958.
- Buy/Protect/Sell*. Maine Farmland Trust, 2016, www.maineFarmlandtrust.org/farmland-protection-new/buyprotectsell/.
- Byun, Pillsung, and Adrian X. Esparza. "A revisionist model of suburbanization and sprawl: The role of political fragmentation, growth control, and spillovers." *Journal of Planning Education and Research* 24.3 (2005): 252-264.
- Center for Land Use Education. *Planning Implementation Tools Transfer of Development Rights (TDR)*. University of Wisconsin, 2005.
- City of Auburn Comprehensive Plan*: 2010 Update. 2010.
- "Cluster Development." *Preserving and Protecting the Brookside Area*, Friends of Brookside, MA, 2009, friendsofbrookside.org/projects/cluster-development/.
- Daniels, Thomas L. "The purchase of development rights: preserving agricultural land and open space." *Journal of the American Planning Association* 57.4 (1991): 421-431.

“Definitions.” *Land Use Management Definitions*,
www.agriculture.gov.au/abares/aclump/definitions.

Department of Planning and Zoning. “Burlington Comprehensive Development Ordinance: ARTICLE 4: ZONING MAPS AND DISTRICTS .” *Burlington Comprehensive Development Ordinance: ARTICLE 4: ZONING MAPS AND DISTRICTS* , 2014.

Department of Regional Planning. “Los Angeles County Department of Regional Planning.” *DRP Main RSS*, planning.lacounty.gov/compact.

“Development Proposals.” Dutchess Land Conservancy, *Dutchess Land Conservancy, NY*, 10 Apr. 2013,
dutchessland.org/our-work/working-with-municipalities/development-proposals/.

Diaz, Daniel, and Gary Paul Green. "Growth management and agriculture: An examination of local efforts to manage growth and preserve farmland in Wisconsin cities, villages, and towns." *Rural sociology* 66.3 (2001): 317-341.

Eureka Township Envisioning Task Force. *What Is Cluster Development?*, Eureka Township, Dakota County, Minnesota, 2016.

Ferro, John. “North East Farm Is Protected from Development.” *The Poughkeepsie Journal*, Poughkeepsie Journal, 6 June 2017.

Frederic, Paul B. “Auburn Farm Study.” 25 May 1984.

Frederic, Paul B. *Protecting Farmland Protection: The Case of Auburn, ME*. 1986.

Göçmen, Z. Aslıgül. "Barriers to successful implementation of conservation subdivision design: A closer look at land use regulations and subdivision permitting process." *Landscape and Urban Planning* 110 (2013): 123-133.

Heimlich, L. B. R. E., & Anderson, W. D., “Development at the urban fringe and beyond: impacts on agriculture and rural land”. Economic Research Service, Washington DC: US Department of Agriculture, 2001.

Herold, M., Couclelis, H., & Clarke, K. C., “The role of spatial metrics in the analysis and modeling of urban land use change,” *Computers, environment and urban systems*, 29(4), 2005, 369-399.

“Intervale Center History.” Intervale Center, 2018, www.intervale.org/.

“Land Use Ordinance: Section VI.” *Land Use Ordinance: Section VI*, Town of Unity, 2009, pp. 18–20.

- Meter, Ken, and Megan Phillips Goldenberg. "Auburn's Agricultural and Resource Protection Zoning (AGRP): Consultant Recommendations." 12 Feb. 2018. prepared for the Ad Hoc Committee, City of Auburn, Maine.
- Mosher, Rosemary. "Development Potential - AG Zone." *City of Auburn, Data Portal*, 18 Mar. 2019.
- Pailthorp, Bellamy. "Seattle Deal Would Trade Iconic Views to Preserve Farmland and Forests." *KNKX*, KNKX Tacoma, Washington Public Radio, 24 July 2012, www.knkx.org/post/seattle-deal-would-trade-iconic-views-preserve-farmland-and-forests.
- Pfeffer, Max J., and Mark B. Lapping. "Public and farmer support for purchase of development rights in the metropolitan Northeast." *Journal of soil and water conservation* 50.1 (1995): 30-33.
- Promote Open Space Conservation/Cluster Development Subdivisions*. HOW TO Planning Series, Strafford Regional Planning Commission, 2004.
- Ryan, R. L., "Comparing the attitudes of local residents, planners, and developers about preserving rural character in New England," *Landscape and Urban Planning*, 75(1-2), 2006, 5-22.
- Smith, Michael D., and Deborah Giraud. "Traditional Land-Use Planning Regulation and Agricultural Land Conservation: A Case Study from the USA." *Taylor & Francis*, Nov. 2006.
- Smith, Stewart N. "Remarks by Commissioner Stewart N. Smith Concerning the Auburn Agricultural Protection Zone Ordinance Before the Members of the Auburn City Council." 3 Oct. 1983, Auburn.
- Triedman, Lucy, et al. "A Study of the Feasibility of a Transfer of Development Rights Program in Lewiston, Maine." Bates College. (2014).
- Maine.gov. "Transferable Development Rights." *Municipal Planning*, <https://www.maine.gov/dacf/municipalplanning/docs/transferdevrightsintro.pdf>.
- Maine GeoLibrary Board. "Maine Orthoimagery Regional 2018." *Maine Geolibrary Data Catalog*, Maine GIS Department, 17 Feb. 2018, geolibrary-maine.opendata.arcgis.com/datasets/a05ce6d9942948cf91761002c87a7a6a.
- Maine State Planning Office, and Code Enforcement Officer Training and Certification Program. "Municipal Codes, Enforcement Officers, Training and Certification Manual." *State Planning Office*, 2010, pp. 5–48.

Miskowiak, Douglas, and Linda Stoll . “Planning Implementation Tools: Transfer of Development Rights (TDR).” *University of Wisconsin, Center for Land Use Education*, Nov. 2006.

National Conference of State Legislatures. “State Statutes and Programs Concerning Community Gardens.” *LA County Planning*, Mar. 2014.

Wisconsin Dept. of Agriculture, Trade & Consumer Protection. “Wisconsin Farmland Preservation Zoning,” Aug. 2015.

York, Abigail M., and Darla K. Munroe. "Urban encroachment, forest regrowth and land-use institutions: Does zoning matter?." *Land Use Policy* 27.2 (2010): 471-479.

Zigas, Eli. “Guide to Implementing the Urban Agriculture Incentive Zones Act.” *University of California: Agriculture and Natural Resources*, Nov. 2013.

Appendices

Appendix 1: People of Acknowledgement

Francis Eanes, Visiting Assistant Professor of Environmental Studies, Bates College

Karen Palin, Lecturer in Microbiology, Bates College

Chris Carson, President, CampusTours Inc., Ag Zone Resident

William Sylvester, Land Owner in AGRP, Forester and Ad-Hoc Committee Member

Maurice Keene, Dairy Farm Owner

Rosemary Mosher, Geospatial Database Manager, City of Auburn

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Tom Lynch, GIS Coordinator, State of Maine

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Appendix 2: Key Definitions

Zoning

Zoning consists of the public regulation of land use. State legislatures typically hold the power to authorize zoning, which cities can then enact their own zoning ordinance. Zoning has progressed

from protecting single family homes from intrusion by factories or tenements, to the exact regulation of the size of lots, density of development, size of building, and placement on a lot (Maine State Planning Committee, 7).

Land use

Land use refers to the purpose that land cover is committed to. Some land uses, such as agriculture, have a characteristic land cover pattern. Other land uses, such as nature conservation, are not easily legible by a characteristic land cover pattern. For example, where the land cover is woodland, the land *use* may be timber production, grazing or nature conservation (“Definitions”).

Land cover

Land cover refers to the physical surface of the earth, including vegetation types, soils, exposed rocks and water bodies as well as anthropogenic elements, such as agriculture and built environments. Land cover classes can usually be discriminated by characteristic patterns using remote sensing (“Definitions”).

Land banking

Land banking is a real estate investment scheme that involves buying large blocks of undeveloped land with a view to selling the land at a profit when it has been approved for development (Australian Securities & Investments Commission).

Transfer of Development Rights (TDR)

Transfer of Development Rights (TDR) is a voluntary, incentive-based program that allows landowners to sell development rights from their land to a developer or other interested party who then can use these rights to increase the density of development at another designated location (Miskowiak and Stoll, 1).

Appendix 3: Questions in Addressing Alternatives

ALTERNATIVES → ACTORS → FUNDING → RELEVANCE

<u>ALTERNATIVES</u> <ul style="list-style-type: none"> • <i>How does the variety of models work together and/or against each other?</i> • <i>How does geography influence models?</i> • <i>What are the implications of socioeconomic/political leanings/historical context of the city?</i>
<u>ACTORS</u> <ul style="list-style-type: none"> • <i>Who has the most significant role in developing land use alternatives?</i> <ul style="list-style-type: none"> ○ <i>Local municipalities?</i> ○ <i>State government?</i> ○ <i>Landowners?</i> • <i>Outside entities such as land trusts? How do these entities work together?</i>
<u>FUNDING</u> <ul style="list-style-type: none"> • <i>Where is the money coming from to support land use alternatives? How does that influence the future of the land and sustainability of the plan?</i>
<u>RELEVANCE</u> <ul style="list-style-type: none"> • <i>How does the information collected from previous steps relate to Auburn's predicament? What lessons can be learned from other towns/cities successes and/or failures when considering which land use alternatives would be best for Auburn?</i>

Appendix 4: Other Region's Alternatives

Los Angeles

Historical Context of Place

Up until the 1950s, Los Angeles County was the top agricultural county in the U.S. and known for having the “best soil” and ideal climate. Wheat and cattle were some of the major products of the region. But, upon the gold rush and the introduction of the railroad system, the population began to grow rapidly (Behrens). The state of California as a whole has experienced a severe loss of agricultural land since the 1950s, specifically in Los Angeles where development has spread into the majority of previously exclusively agricultural land. Some estimate that the amount of farmland lost per year, since 1950, is more than 50,000 acres (Smith and Giraud). This surge in development is mostly fuelled by the growing economy and population in California. Urbanization and industrialization too are certainly factors in the disappearance of agricultural land and natural resources. However, urban agriculture is making a comeback in Los Angeles County, with a 19% increase in home vegetable gardening between 2008 and 2009 (Behrens).

Specific Approaches and Alternatives Referenced: Limitations and Successes

In an effort to promote urban agriculture, the California State Legislature adopted an Urban Agriculture Incentive Zone Program (UAIZ), or Assembly Bill 551, in 2013. In 2015, the Los Angeles County Board of Supervisors passed a motion directing a local UAIZ program to be implemented countywide. The UAIZ laws aim to accomplish two things: increasing the use of privately owned vacant lots for urban agriculture and improving land security for these urban

agriculture projects (Zigas). City governments can designate areas as “urban agriculture incentive zones” in a contract with landowners who agree to restrict the use of their land, for a minimum of five years, to small scale agricultural production. In turn, the landowners pay reduced property taxes. This alternative considers a transfer of development rights, where governments can promote urban agriculture through developing private land; and the residents of that land receive benefits such as lower property taxes (Zigas).

Within these incentivized agriculture zones, community gardens are a common approach to urban farming. Such gardens can provide readily accessible fresh food to communities that may otherwise lack this access. Socially, they provide outdoor recreational hobbies for citizens. Politically, they promote a healthy population, reduce public health costs, and beautify city space. Economically, this beautification may protect property value. Lastly, on an environmental level, they provide places for water to infiltrate into the ground and habitats for species, as well as working to combat the urban “heat island” effect (National Conference of State Legislatures).

Additionally, Los Angeles County passed an ordinance for compact small lot subdivision. With this, a division of land can be utilized to create smaller, fee-simple, single-family residential lots. This type of cluster housing results in affordable homeownership, diversity of housing types, neighborhood stability and smart growth for vacant parcels. In addition to the land-use approaches above that utilize vacant land by transferring development rights and promoting urban agriculture, Los Angeles County also employs the use of cluster housing on such vacant lots.

Answers to Flowchart Above

Alternatives

The implementation of urban agriculture incentive zones allows for the protection and use of vacant lots with agricultural potential. By designating these zones, the city government provides space for agricultural production in a developed city. In doing this, the city government is also forced to consider efficient residential programs that will work hand-in-hand with increased urban agriculture. Compact Lot Subdivision, or cluster housing, is complementary to the urban agriculture incentive zones because it too promotes an efficient use of land and promotes community engagement and coherence.

Actors

The influencers that made UAIZ and Compact Lot Subdivision successful are important to consider. City governments in California, with approval from their county board of supervisors, can designate areas as “urban agriculture incentive zones” (Zigas). These city and county government then enter into contracts with landowners who agree to restrict the use of their land. The city government also decides on the scale of the zone (i.e. one large area or various smaller ones). While the city government is certainly the facilitator in implementing urban agriculture, landowners of vacant lots are also responsible for entering and agreeing upon these contracts. More specifically, according to California Education Code 51795-51797, there is an established Instructional School Gardens program, under the State Department of Education. The regulation permits school districts to apply for grants to create school gardens. While the government is ultimately funding the program, schools are also important actors in initiating a changing urban landscape.

Funding

The governments in California are responsible for the incentivizing of the development of urban agriculture, and for the funding of various other projects like school gardens. But, the hope is that urban agriculture will also beautify the city space, educate communities about fresh food and the process of production, provide ecological benefits to an urban region and lastly provide modest economic development for further urban agricultural practices.

Auburn Applicability

Though Los Angeles is far larger in population and geographical scale, the prior mentioned practices and approaches can be utilized as potential models for the use and development of Auburn's Agricultural District. Both Los Angeles and Auburn face the same challenge of inflicting development and urbanization. Both regions can apply alternative #1, the transfer of development rights, to incentivize agricultural production on otherwise vacant lots. Additionally, community gardens that thrive in Los Angeles may also be a potential alternative in Auburn's Agriculture and Natural Resource Protection District. With communities such as the Somali-Bantu, and veteran communities as well, demonstrating interest in community gardening in Auburn, it seems to be a feasible alternative (Frederic). Lastly, with an increased demand for housing development and various open lots in Auburn's Agriculture District, cluster housing may be a feasible alternative as well. Just like it does in Los Angeles, cluster housing would promote community togetherness and home affordability in Auburn.

Wisconsin

Historical Context of Place

Wisconsin, known as "America's Dairyland" and a traditionally agricultural state has in recent years worked to stem the tide of development and farmland loss which is going on across

the country. Over one million acres of farmland are lost in the United States each year, and Wisconsin is one of the states that is currently bearing this burden. According to Diaz and Green, From 1950 to 1998, the amount of farmland in Wisconsin decreased from 23.6 million acres to 16.4 million acres: this represents a 31% decrease (Diaz & Green, 2001).

The loss of farmland in Wisconsin is potentially bad for its economy, to which agriculture contributes \$88.3 billion annually (WI DATCP, 2018). The loss of agricultural land also threatens traditional social structures in a state which has been dominated by agriculture for decades and in which agriculture plays a major social role.

Specific Approaches and Alternatives Referenced: Limitations and Successes

Wisconsin has two main methods to preserve farmland state-wide: exclusive zoning and Agricultural Enterprise Areas. Wisconsin offers tax bonuses to farmers who zone their land exclusively for agriculture, which provides a powerful incentive for farmers to participate in the program (Diaz & Green, 2001). The agricultural zoning has been implemented in 42 of Wisconsin's 72 counties. Most of the zoned land is in the southeastern part of the state which is the most urbanized part of the state. Agricultural Enterprise Areas (AEA) are areas designated by the state to be used for agriculture, at the behest of local farmers and citizens who petition the state to zone the area in this way. When an AEA is created, it must remain agricultural land for fifteen years (McCollum, 2014). Currently, approximately 2,000,000 acres of land in Wisconsin are eligible for the AEA designation, representing approximately 5% of Wisconsin's total area.

Wisconsin farmers who zone their land for agriculture receive an income tax credit from the state of Wisconsin (WI DATCP, 2018). Those who can qualify for the tax credit must be

residents of the state of Wisconsin, work the land in compliance with soil and water standards, and gross at least \$6,000 a year in farm revenue. These standards should be quite easy for any working farm in Wisconsin to meet. According to the Wisconsin Department of Agriculture's website, a landowner will receive a \$7.50 income tax credit for every acre of land they own if they elect to zone their land for agriculture and a \$10.00 income tax credit for every acre of land if they elect to zone their land for agriculture when it is in an AEA.

The limitations of the programs in Wisconsin are clear: they primarily rely on farmers and citizens deciding to zone their land in a certain way. It is likely that non-farmers and developers will not be interested in this type of zoning. Furthermore, because the programs are voluntary, as development pressure increases, it is less likely that farmers will participate.

Answers to Flowchart Above

Alternatives

AEA's are quite similar to Auburn's AGRP zone as they are designated by local communities as agriculture-only spaces. AEA's seem like they are a useful way to possibly conserve farmland, but they rely on people being willing to give up land to farm with few tangible benefits in return. The exclusive zoning method that farmers can engage in is likely more useful and effective, though it is susceptible to development pressures.

Actors

Farmers are the most important actors in Wisconsin's agricultural preservation strategy, both in working the land and also in rezoning their land. Thanks to AEA's however, all citizens in

Wisconsin can be helpful in preserving farmland. Experts at the Wisconsin Department of Agriculture play a key role in identifying which land is best for preserving and eligible for rezoning or establishing an AEA.

Funding

AEA's are funded through state tax credits, with the state's budget absorbing the lost income. The Wisconsin Department of Agriculture, Trade, and Consumer Protection is responsible for overseeing and administering the AEA program. Exclusive zoning programs are also sponsored by the State, but due to the local zoning required, include collaboration with local towns, counties, and villages.

Auburn Applicability

Wisconsin's voluntary zoning programs can certainly be a model for Auburn. The system allows farmers to preserve farmland without being overly restrictive of development. One of the benefits of the program is that zoning lasts for fifteen years and is voluntary, so zoning can respond to development and farming needs as they develop, establishing more agricultural land when there is demand and allowing more development when the local economy demands it.

The funding mechanism in Wisconsin presents a potential problem for Auburn because Wisconsin uses state income tax credits which Auburn cannot offer. However, Auburn can offer property tax credits and different property tax rates for land zoned as agricultural land, as the town currently does for property inside the Ag zone.

Appendix 5: Development Potential in the Ag. Zone



Fig 26: Development Potential in the Ag. Zone

Appendix 6: List of Questions asked to Land Use Alternatives Contacts

Unity, Maine Questions

*Although these were the guiding questions to conversations about Section VI of Unity's Land Use Ordinance, conversation with respondents led to other questions and conversation beyond those listed below.

- *How do you incentivize people to "transfer development rights" through the Agriculture Protection Incentive Measure?*
- *Has the Agriculture Protection Incentive Measure been effective in its ability to preserve Unity's agricultural land? What about natural resource protection?*
- *How does the "preferred development" zone work in Unity?*
- *What was the process of creating a preferred development zone for the town of Unity? Has it been utilized?*
- *Is the general public in support of Unity's current zoning?*
- *Do you see a Transfer of Development Rights Program / Agriculture Protection Incentive Measure working in other places that might have a different landscape and/or culture regarding land use? I.e. Auburn...*

Burlington, Vermont Questions

- *Are the RCO zones well-monitored to ensure only intended uses are happening within each subdistrict?*
- *Has the current zoning plan been helpful in mitigating urban sprawl and/or protecting Burlington's natural resources / agricultural land?*
- *Does the public support current zoning of Burlington?*
- *In the RCO: Agriculture- What have been the impacts on farming? Do people farming and owning land the RCO: Agriculture receive tax incentives? Has the city adopted any Transfer of Development Rights Programs? Do individual landowners utilize easements to protect land even within the zone?*